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PLANT COVER, SOIL TEMPERATURE, FREEZE, WATER STRESS, AND EVAPOTRANSPIRATION CONDITIONS

Craig L. Wiegand, Principal Investigator
Co-Investigators: Paul R. Nixon
Harold W. Gausman
L. Neal Namken
Ross W. Leamer
Arthur J. Richardson

Science and Education Administration
U.S. Department of Agriculture
P. O. Box 267
Weslaco, TX 78596

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15. Supplementary Notes

16. Abstract

In the absence of HCMM thermal data, a study was made of the relation between surface temperature and soil association using 0932 daytime thermal data from NOAA-5 for 26 July 1977. Surface temperature ranged from 23.8 C for the coastal Mustang association to 31.9 C for the inland rangeland Delmita-Randado association. The data illustrate the temperature gradient that should exist from the coast inland in HCMM data. Landsat digital counts for a number of agricultural fields have been extracted from 15 June and 12 July, 1978, overpasses. The perpendicular vegetation index (PVI) and other vegetation indexes have been calculated for relating HCMM-indicated surface temperatures to vegetation density.

17. Key Words (Selected by Author(s))	18. Distribution Statement
Heat Capacity Mapping Mission, HCMM Soil Temperature, Freeze, Water Stress, Plant Cover, Canopy Temp., Thermal Scanner, Crop Stress, Evapotranspiration	

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TYPE II QUARTERLY PROGRESS REPORT

June 1, 1979 to September 1, 1979

A. Problems:

The geographical location of our test site (97°W Long., 26°N Lat.) puts it on the fringe of the receiving range of the NASA ground stations. Consequently, it is becoming apparent that we will not receive HCMM data for a number of dates when cloud conditions would have permitted excellent test site coverage.

The long-standing problem, lack of HCMM CCT, was eliminated by receipt on 27 Aug. of CCT for two dates--12 June and 13 July, 1978. Both scenes were obtained under partly cloudy conditions; we will use as much of the data as we can.

B. Accomplishments:

1. Soil temperature by soil association.

The results of a study to relate surface temperature and soil association are given in Table 1. The data used were the NOAA-5 0.9 km resolution (at nadir) thermal infrared data for an overpass on 26 July 1977. The temperature ranged from 23.8 C for the coastal Mustang association to 31.9 C for the inland Delmita-Randado association. Standard deviation of the means range from 0.63 to 2.08. The overpass, time was 0932 CST, well before the daily maxima could have occurred. The data illustrate the temperature gradient inland from the coast and one kind of analysis that should be available using HCMM thermal data.

2. Vegetation indexes from Landsat.

We anticipate that vegetation density will be the dominant variable affecting surface tmeperature during rainless periods. In order to have estimates of vegetative cover conditions for more sites than we could ground truth, we ordered Landsat digital tapes for the 15 June and July 12, 1978, overpasses and calculated the perpendicular vegetation index (PVI) for selected sites and test fields. When we have extracted the temperatures from the HCMM data tapes for the same fields and sites we'll relate the two.

C. Significant Results:

None.

D. Publications:

None.

E. Recommendations:

None.

F. Funds Expended:

Allotment for FY 78	$ 45,240
Allotment for FY 79	59,760
Total	105,000
Location and Indirect Program Costs	24,200
Other Costs through September 1, 1979	
Salaries	53,733
Travel & Trans. of Persons	4,441
Transportation of Things	21
Services & Supplies	9,595
Equipment	4,393
Total	$ 96,383
Balance	8,617

G. Data Utility:

None.

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Table 1. Relation between NOAA-5 satellite indicated surface temperature and soil associations in the Lower Rio Grande Valley for the 0932 daytime overpass on 26 July 1977.

Soil Association	Number	Hectares	Temperature, °C	Stnd. Dev., °C
Loamy soils of flood plains and low terraces, level				
Laredo-Olmito	11	46676	27.84	1.32
Reynosa-Runn	12	9409	30.00	0.63
Rio Grande-Matamoros	13	40833	29.55	1.94
Loamy and clayey soils of uplands, level				
Catarina-Copita	21	56177	29.92	0.63
Lyford-Raymondville	22	10885	27.45	1.45
Hidalgo	23	26044	30.06	0.67
Hidalgo-Raymondville	24	17373	29.50	0.85
Raymondville	25	41356	29.73	1.23
Raymondville-Mercedes	26	9071	29.54	1.10
Raymondville-Lyford	27	24875	27.95	1.24
Willacy-Racombes	28	19248	29.91	1.04
Willacy-Raymondville	29	33300	28.88	1.34
Moderately deep to shallow, loamy upland soil, gently sloping				
Delmita-Randado	31	50673	31.88	0.64
Loamy soils of uplands, gently sloping				
Copita	41	16512	30.06	0.70
Pharr-Brennan	42	27181	30.62	1.12
Hidalgo-Pharr	43	29272	29.83	0.94
McAllen	44	2245	30.78	1.10
McAllen-Brennan	45	168592	31.22	0.71
McAllen-Zapata	46	41202	29.68	0.90
Willacy-Delfina	47	21647	30.66	1.21
Willacy-Pharr	48	36713	30.54	1.18
Sandy, upland soil, gently sloping				
Comitas	51	1414	31.01	1.16
Comitas-Delmita	52	7103	32.11	0.71
Duneland	53	1722	26.66	1.68
Nueces-Sarita	54	77024	30.86	0.99
Sarita-Falfurrias	55	18264	31.40	1.52
Shrink-swell clayey soils, level, slowly permeable				
Harlingen	61	30256	29.14	1.00
Harlingen-Benito	62	19832	28.26	1.28
Mercedes	63	13437	29.32	1.23
Gravelly, loamy, shallow, undulating				
Jimenez Quemado	71	10454	31.06	0.83

Loamy soils of flood plains and low terraces, level

Laredo-Olmito	11	46676	27.84	1.32
Reynosa-Runn	12	9409	30.00	0.63
Rio Grande-Matamoros	13	40833	29.55	1.94

Loamy and clayey soils of uplands, level

Catarina-Copita	21	56177	29.92	0.63
Lyford-Raymondville	22	10835	27.45	1.45
Hidalgo	23	26044	30.06	0.67
Hidalgo-Raymondville	24	17373	29.50	0.85
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Moderately deep to shallow, loamy upland soil, gently sloping

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Pharr-Brennan	42	27181	30.62	1.12
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Shrink-swell clayey soils, level, slowly permeable

Harlingen	61	30256	29.14	1.00
Harlingen-Benito	62	19832	28.26	1.28
Mercedes	63	13437	29.32	1.23

Gravelly, loamy, shallow, undulating

Jimenez Quemado	71	10454	31.06	0.83

Clayey and loamy soil, saline, level, slowly permeable

Sejita-Lomalta	81	57222	25.70	1.98
Laredo saline	91	9132	25.78	1.63
Willamar	92	33761	26.55	1.50

Sands, permeable, coastal

Mustang	82	22108	23.79	2.08

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